Space Weather Forecast

Issued on Friday, 30 December 2022 at 01:30 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Chance of Minor Geomagnetic Storms on 30 December. Chance of Moderate-class X-ray flares throughout.

Analysis of Space Weather Activity over past 24 hours
Solar Activity: Solar activity has been Moderate, with two Moderate-class flare observed from a region just on the northeast limb. Two sunspots in the northwest quadrant, which were previously responsible for a significant risk of flares, appear to be weakening and are rotating towards the western limb. The large region in the northwest appears to be currently stable. The remaining regions all appear generally simple. No Earth directed Coronal Mass Ejections (CMEs) were observed in available imagery during the period.

Solar Wind / Geomagnetic Activity: Solar wind speeds sharply increased to elevated levels towards the end of the period, perhaps due to a CME which left the Sun on 25 December. This was accompanied by an increase in the magnetic field strength from weak to moderate levels. The north-south component of the magnetic field also became sharply negative for a time after varying weakly for much of the day. Resulting geomagnetic activity was Quiet to Unsettled, with one Active interval at the end of the period.(Kp 0-2).

Energetic Particles / Solar Radiation: No solar radiation storms were observed, with energetic particle count rates at background levels.

Four-Day Space Weather Forecast Summary
Solar Activity: Solar activity is expected to be Low with a chance of isolated Moderate activity. There is an increasing potential risk of more frequent elevated activity from a region which is rotating onto the eastern hemisphere.

Solar Wind / Geomagnetic Activity: A CME appears to be affecting the Earth, with residual effects possible through the next four days. A fast wind is then forecast to connect with the Earth on 30 December, perhaps giving elevated or strong solar wind speeds. There is a chance that recent observations of the solar wind could be due to a fast solar wind connection rather than a CME, with further analysis of the data required.

Geomagnetic activity is expected to be largely Unsettled to Active on 30 December with a chance of G1/Minor Storm intervals. due to the onset of the fast wind or the CME. Geomagnetic activity and the risk of G1/Minor Storms should reduce through 01 and 02 January as the high speed stream influence slowly eases.

Energetic Particles / Solar Radiation: No solar radiation storms are expected, however there is a slight chance of an increase in energetic particles to the S1/Minor Storm level, should any larger flares occur.

Issued by Met Office Space Weather Advisor, Tel: +44 (0) 330 135 4254 Email: moswoc@metoffice.gov.uk

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	50	30	10	1
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	40	40	40	40
Very Active	R3 to R5 X	No	5	5	5	5

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	5	5	5	5
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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